RESPONSES TO COMMENTS ON THE
DRAFT 2010 SFER – VOLUME I, CHAPTER 6

Fred Sklar with Chapter Co-Authors

Level of Panel Review: Technical (primary); Integrative (secondary)
Reviewers: J. Burkholder (AA), E. van Donk (A), J. Burger (A)

Recommendation #1: *What, in the authors' opinion, is the underlying reason for low nesting success of roseate spoonbills in WY2009, whereas other wading bird populations had highly successful nesting? (lines 345-346)*

Response #1: While roseate spoonbill nesting effort (numbers of nests) in Florida Bay was low during WY2009, nesting success (numbers chicks/nest) was actually very high. This disconnect appears related to high natal colony fidelity and poor recruitment over past decades which has led to a declining adult breeding population, but recent changes to water management have improved foraging conditions and thus breeding success. Thus, conditions in recent years appear more conducive to nesting, but there are not sufficient nesting adults in the area to take advantage of it. Below is a slightly edited quote from the 2009 South Florida Wading Bird Report by Dr. Jerry Lorenz, a spoonbill expert at the Audubon Society, that provides more details.

"Based on our banding and tracking studies of roseate spoonbills, we estimate that the average age at mortality in the wild is probably close to 25 years. Based on this assumption, most of the spoonbills hatched in Florida Bay prior to completion of the South Dade Conveyance System (SDCS) are no longer alive. Because there were only seven successful nesting years between 1982-83 and 2003-04 in the Northeast region (Lorenz and Frezza 2007), the most productive region of the bay for much of this time period, it is highly unlikely that the breeding adults from the pre-SDCS period were being replaced in the population at the same historical rate that occurred from 1935 to 1978 (Lorenz et al. 2002). In addition, we have found that the vast majority of spoonbills return to the area of their natal colonies to nest, indicating that the Florida Bay population is largely closed to immigration. Thus, the number of chicks reaching sexual maturity has been lower than the number of adults lost to mortality, resulting in a reduction in breeding-age birds in the bay and an associated decline in nesting effort. We predict that the two consecutive years of bay-wide nesting success in 2007-08 and 2008-09, combined with the prior two consecutive years of successful reproduction in the Northwest and Northeast colonies, will result in a reversal of this decline in nesting activity over the next few years, as the chicks hatched over the last four years should reach sexual maturity and return to the bay to nest. If these preliminary results hold true, then the actions of the SFWMD in considering spoonbills in water management decisions (which, at least in part, led to those years of success) may have prevented this iconic species of Florida Bay from becoming locally extirpated. Although these efforts are much appreciated for the time being, ultimately the goal of the Comprehensive Everglades Restoration Plan is to restore the system such that spoonbills (and the other species for which they serve as an umbrella indicator species) successfully reproduce without the intervention of water managers. In the short term, completion of Phase 1 of the C-111 Spreader Canal Project will be the first productive step toward achieving that goal."

Recommendation #2: *The total CO2 emissions from peat loss in the Everglades were estimated at 6 billion tonnes over the past ~100 years (line 86). How does this value compare to carbon emissions from various present-day pollution sources of concern in the Florida area?*

Response #2: For the final version, the following text will be added to the Summary section: The total CO2 emissions numbers were corrected for the datum differences between the two surfaces and this gave an estimate of 3.4 billion metric tons. The number (6 billion) in Table 6.1 has been corrected (to 3.4 billion) but the values in the narrative and Table 6.10 were correct. Also, these values assume that all the carbon lost from the Everglades eventually ended up as carbon dioxide.

For the final version, the following text will be added to the Landscape Processes section: The Union of Concerned Scientists (2007) report that the annual carbon dioxide emission total from fossil fuels in the U.S. is about 6 billion metric tons (Table 1, below). For Florida, the USEPA (2007) reports the total as about 256 million metric tons (Table 2, below). Keeping in mind that the highest peat loss occurred during the canal drainage period (1880s-1940s), on a rough, average annual basis, the carbon emissions from the Everglades were estimated to have been equivalent to about 13% of the current Florida fossil fuel carbon emissions (or about a quarter of that from transportation and electric power generation in Florida) and about 0.6% of the annual national fossil fuel emissions.

Table 1. Annual Carbon Dioxide Emissions for China and the U.S. (2006)*.

Country	Total Emissions	Per Capita Emissions
	(Million metric tons of CO2)	(Tons/capita)
China	6017.69	4.58
United States	5902.75	19.78

*Source: http://www.ucsusa.org/global_warming/science_and_impacts/science/each-countrys-share-of-co2.html

Table 2. Annual Carbon Dioxide Emissions for Florida (2007).

CO2 Emissions from Fossil Fuel Combustion - Million Metric Tons CO2 (MMTCO2)**

Florida (total)	256.27
Commercial	4.33
Industrial	12.34
Residential	1.76
Transportation	114.73
Electric Power	123.10

**Source: http://www.epa.gov/climatechange/emissions/downloads/CO2FFC_2007.pdf

Recommendation #3:   *In the CHIP project, has there been an increase in herbivory on submersed aquatic vegetation in plots where cattail was removed?*

Response #3: We did not measure herbivory and therefore have no ability to assess an increase.

Recommendation #4*: Is the District beginning to plan for effects of climate change on the Everglades ecosystem? If so, how?*

Response #4: Yes, a White Paper will soon be distributed to the Governing Board to create the authorization to proceed with science and modeling. Science programs within the Everglades Division will likely include investigations into the impacts of climate change on the carbon cycle; esp. peat accumulation rates and the ability of coastal habitats to keep up with sea level rise.

General Comments

This chapter, generally excellent in technical quality as in previous SFERs, examined the biological components of some of the bioindicators and processes used to assess the health and well-being of the Everglades, as well as performance measures. Under Fred Sklar and his editorial team, most sections were well written, consistently in style, clear, and maintained a high level of interest for the reader. The identification of section authors aids in ownership and overall improvements to the quality of the chapter. In addition to the ongoing, well-conceived monitoring efforts (hydrology, wading birds, etc.), exciting progress in some areas was described toward understanding the Everglades Protection Area (EPA), including the development of improved technology and indices.

Technical Review
Most sections of Chapter 6 are well written, clearly explained, and well referenced. Helpful details and clear explanations are also provided in Methods sections (e.g. pp.6-20, 6-23).

Recommendation #5: Hypotheses are stated for some studies but not for others, and should be treated consistently throughout the chapter. While this means repeating hypotheses given in other documents, to assist readers at least the overarching or main hypotheses should be given, for example, for the CHIP sub-section (as they were for the FIRE sub-section).

Response #5: A table of hypotheses similar to that in last year's report will be added in the final version.

This section provides a succinct, clear overview of efforts, findings, and significance of progress in WY2009 for each of five areas of emphasis including hydrology (although not presented as a separate sub-section), wildlife, plants, the ecosystem, and the landscape.

Recommendation #6: Lines 42-44 - Brief explanation would be helpful here as to how prey abundances may be linked to hydrologic stability.

Response #6: The life history of many aquatic invertebrates are coupled to environmental cues, one of them being the natural hydrologic cycle. Water management strategies that more closely mimic natural hydroperiods (i.e., water depths, length of inundation, and hydroperiods) may be important in maintaining prey abundances that encourage successful predator populations.

Recommendation #7: Line 74 - Writing should be added to explain that this is a "target" concentration.

Response #7: In the final version, the following additional text will be added to the section. Based upon reflux enclosure experiments in WCA-2A, a simple model of soil and water phosphorus exchanges was used to estimate the time required to reduce the phosphorus-enriched soil to background level (500 mg/kg) proposed for the Everglades by the U. S. Environmental Protection Agency (2007). Six modeled scenarios of three surface water inflow concentrations (10, 20, or 50 μg/L) and two non-labile soil phosphorus rate constants (0.022/yr and 0.01/yr) suggest that 67 to 100-plus years would be required to achieve soil phosphorus concentrations of 500 mg/kg.

Recommendation #8: Line 81 - Should mention both valuable indices to which the South Florida Water Depth Assessment Tool has been linked, and should add a sentence of explanation about the indices.

Response #8: In the final version, the following additional text will be added to the section. The muck fire and recession indices are utilized during the dry season to ascertain areas that have the potential for serious muck fire ignition and to gain insight by spatially animating daily water depth recession rates for the purpose of managing for better wading bird habitat conditions. The inundation index is utilized during the wet season to ascertain water depth increases in relation to floral and faunal hydrologic requirements.

Recommendation #9*: Line 86 - Should briefly explain the reasons for peat loss.*

Response #9: In the final version, the following additional text will be added to the section. Peat loss in the Everglades is due to the oxidation of the peat because of drainage or drought. Drainage or drought removes water from the surface of the peat, leading to microbial oxidation of the organic carbon or fire, causing the carbon in the peat to be converted to carbon dioxide.

Recommendation #10*: Table 1 - The subsection title, "Crayfish Population Dynamics", does not seem to match the "Findings" description or the sub-section title (p. 6-20) and should be altered. The sub-section title on p.6-20 does not capture what was done (macroinvertebrate survey, crayfish and others), either.*

Response #10: We included this study in the 2010 SFER because of the fundamental questions it addresses regarding links between hydrologic conditions, aquatic communities and wading bird foraging, as well as the compelling methodological component that involves large-scale and extreme hydrologic/biotic experimental manipulations at the LILA facility. The 2009 results are relatively less interesting at this juncture since they provide only baseline population and community data prior to manipulations in 2010 and thus do not represent 'findings' per se. Nonetheless, we did find interesting community patterns related to flowing and non-flowing habitats that we felt worthy of sharing but are not directly related to the primary hypothesis. We have amended the findings summary to clarify this.

Recommendation #11*: The significance of "Variation in Macroinvertebrate Communities" findings should be briefly stated.*

Response #11: The results indicate that macroinvertebrate communities vary in space (among conservation areas) and time (between seasons). Spatial variation may be attributed to nutrient loading and to hydrologic differences among the conservation areas. The strong seasonal pattern, higher abundances in the wet season, suggests that hydrology (e.g., water depths and hydroperiod) may be an important life history factor. Further analysis is required to separate hydrology from other important life history cues (e.g., temperature and light) and from nutrient effects to establish invertebrate responses to water management.

Recommendation #12*: Figure 6-5 - needs 1-2 sentences of discussion in the text (thus far it is not mentioned in the writing).*

Response #12: In the final version, the following text will be added to the section.

The hydrologic pattern in central WCA-3A (Gage-64) in WY08 did not suffer the drought as much as the northeast WCA-3A (**Figure 6-5**). Although there was no MFL violation to speak of, there was instead a greatly reduced wet-season stage. Water depths did not go above 1 ft until October and never went over 2 ft the entire water year. What should have been a great wading bird foraging environment starting in March was instead disrupted by increasing water levels rather than decreasing water levels for almost the entire nesting (dry) season. Last year the shallow depths and short duration of the wet season was probably sufficient to cause widespread depletion of wading bird prey species. This year, the lack of foraging and the longer hydroperiod may well translate into a banner prey-base for next year (WY09).

Recommendation #13*: Lines 245-246 - should clarify whether more survey flights are planned over WCA-3B next year.*

Response #13: We do not have the funds or personnel to survey system-wide on a weekly basis, and thus we do our utmost to integrate monitoring with other activities such as CHIP. However, the Systematic Reconnaissance Flights monitor wading bird foraging system-wide on a monthly basis and data for WCA-3B will be available in the near future. Text in the chapter will be updated to reflect this.

Hydrology
The sequence of rain in the past three years consisted of a severe drought, then above-average rainfall and many reversals in the dry season, then (WY2009) below-average rainfall with normal pattern (timing) and no reversals throughout the EPA until May 2009. That May, however, was the second wettest in the District's history. The hydrological conditions set up excellent nesting conditions for most wading bird populations (below), prolonged in most areas. Unfortunately, the May conditions abruptly ended conditions of favorable water recession rates.

As in previous years, this is an excellent section that sets the stage for what happened in the WCAs and Northeast Shark River Slough (especially to wading birds) in WY2009. The figures, complete with red-yellow-green indicators for foraging conditions, provide clear comparative information about tree islands and peat conservation as well as foraging conditions for wading birds.

Wildlife Ecology

The District's goals in studies on wildlife ecology in the EPA are (short-term) to prevent further environmental degradation and (long-term) to restore historical wildlife populations. The three areas of focus in WY2009 included wading bird nesting patterns, crayfish population dynamics, and variation in macroinvertebrate communities. An exciting finding was that WY2009 was a "banner year" in which about 80,000 nests were built by wading birds, representing the largest nesting effort recorded in the EPA since the 1940s and a 90% increase over the average of the past ten seasons. It was very encouraging to learn that Alley North regained its status, lost in the previous two breeding seasons, as the largest colony in South Florida. White ibis and wood stork nests were the most abundant in WY2009 since the pre-drainage period. Unfortunately, the abrupt cessation of favorable conditions in May led to adult abandonment of many fledgling wood storks which were lost through starvation, but wood stork nesting was still evaluated, overall, as relatively successful.

The District's actions are commendable in proceeding to test, through experiments at the Loxahatchee Impoundment Landscape Assessment (LILA) facility, the "predator release" hypothesis as an underlying mechanism for exceptional wading bird nesting events. The groundwork for this effort was completed in WY2009 through a survey of crayfish and other macroinvertebrates in sloughs at the Loxahatchee Impoundment Landscape Assessment facility (LILA). Figure 6-9 nicely conveys the food web changes that were expected to occur one to two years after drying and reduction of predatory fishes. The results suggested that shrimp and molluscs prefer flowing conditions, whereas predatory fish prefer non-flowing conditions. In the third project within this section, important baseline data were gathered on macroinvertebrate community structure and abundance in the WCAs.

Plant Ecology
The two foci in WY2009 were to obtain a first-cut assessment of periphyton cyanotoxins (line 46), and to examine the potential use of ecophysiological variables (stem-water potential, water use patterns, sap flow, leaf gas exchange) in assessment of plant responses to hydrologic conditions and stress.

Periphyton Cyanotoxins

<u>Recommendation #14</u>: *This subsection (including the subsection title in Table 1, and the description on line 46 of the Summary section) seems inappropriately named, because domoic acid (DA) is known to be produced by certain estuarine and marine diatoms, not by cyanobacteria. If any cyanobacteria have been found to produce DA, that should be explicitly stated. Moreover, the writing describes the work as having been done in freshwater areas of the Everglades. If any freshwater diatoms have been found to produce DA, that should be explicitly stated. <u>The writing in this section, the summary, and Table 6-1 should be altered accordingly.</u>*

Response #14:   The reviewer has made a good point about this toxin being most commonly associated with a marine diatom species. However, we do not feel the entire section needs to be re-written to reflect this fact. Our rationale is that the toxin was only found at two sites in very low abundance. Thus, the toxins associated with cyanobacteria are still the main feature of the periphyton studied. However, the text has been amended to state that domoic acid was a distinct find in our periphyton. As a potential explanation for its presence, an article was cited where by a new diatom species found in brackish water is also a producer of this toxin. Further, the sites from which the periphyton that contained this toxin were collected, are some of the most heavily eutrophied and minerally-impacted areas of the Everglades - Northern WCA-2A. So, while the diatoms in question may not have historically been identified at these sites, a reason is that freshwater keys will be used in naming the species, thus misidentifying a potentially euryhaline species that could produce domoic acid.

Tree Island Ecophysiology
<u>Recommendation #15</u>: *Six (12?)[Fred/editors note: this does not require an author reply] physiological variables in nine dominant tree island species (5 native and 4 exotic) were assessed for sensitivity to hydrologic regimes, toward the goal of helping to improve water management and tree island recovery. <u>Lines 722-727 - the exotic species should be identified.</u>*

Response #15:   In the final version, modified text in the section will read: Physiological parameters were measured on native species representing the dominant canopy cover on the tree islands studied. Nine species were measured including pond apple (*Annona glabra*), Florida holly (*Ilex cassine*), sweet bay (*Magnolia virginiana*), swamp bay (*Persea palustris*), bayberry (*Myrica cerifera*), willow (*Salix caroliniana*), cocoplum (*Chrysobalanus icaco*) and two fern species, leather fern (*Acrostichum danaeifolium*) and swamp fern (*Blechnum serrulatum*). Five individuals of each species were randomly chosen to measure the physiological parameters.

Ecosystem Ecology

The authors of this section have been prolific in publishing their research; coauthor Miao, in fact, published a book in 2009, Real World Ecology: Large-Scale and Long-Term Case Studies and Methods. Three projects described within the Ecosystems section are all highly meritorious and are contributing valuable information to assist in Everglades restoration. Two areas of emphasis in WY2009 were FIRE (the Accelerated Recovery on Impacted Areas Project) and CHIP (the Cattail Habitat Improvement Project), two large-scale experiments in water conservation area (WCA)-2A.

A third area of focus was the development of a model of soil-water phosphorus (P) exchange, based upon reflux enclosure experiments in WCA-2A, that was used to estimate the number of years that would be required to reduce P-enriched soils to a background target level of 500 mg/kg. CHIP vs. FIRE - the description of the CHIP study contains two primary objectives but refers readers elsewhere for hypotheses, the experimental design, and specific hypotheses.

Recommendation #16: *The FIRE subsection, in contrast, provides both objectives and overall hypotheses. For consistency and to help readers, the CHIP section should do the same.*

Response #16: Overall hypotheses will be included in the final version.

Recommendation #17: *Lines 880-883 - should include brief background on why phospholipid fatty acids (PLFAs) are being measured, and brief description (with references) of the methodology.*

Response #17: Details and methods were provided in last year's SFER. Each section in the report has a limited page length it is assigned. As a result, not all detail and discussion can be presented.

Recommendation #18: *Lines 888-896 - does periphyton refer only to epiphytes here? to both epiphytes and epipelon? Please clarify.*

Response #18: Data are an average thus reflecting all periphyton assemblages-epiphytes, epipelon and metaphyton. Term epiphyte changed to periphyton.

Recommendation #19: *Lines 889-990, microbial community composition of periphyton - need to clarify meaning here; algae? all microbes including various bacteria, fungi, algae etc.?*

Response #19: The microbial community being described here are all of the functional groups that can be described using PLFA analysis. Text was reworded to make this clearer.

Recommendation #20: *Lines 894-910 - nice use of statistics; however, the data should be interpreted, not merely presented - e.g. briefly explain the significance of more gram-negative vs. gram-positive bacteria, sulfate reducers, and actinomycetes. Supporting references are needed.*

Response #20: Additional text will be added to the final version.

Recommendation #21: *Figure 6-18 - legend should explain the inset photo, which looks like a mat of cyanobacterial periphyton, not Chara.*

Response #21: The inset photo just shows the entire plot, the larger photo was a close up so it is apparent it is *Chara*. Title wording was modified to make it clearer.

Recommendation #22: *Line 922 - sub-section title is inaccurate since the writing describes a study of fish and one (?) macroinvertebrate (crayfish).*

Response #22: Changed to aquatic prey community composition.

Recommendation #23: *P.6-43 - discussion should be added about the effects of fish composition on food web structure and ecosystem functioning.*

Response #23*:* The authors recognize the importance of these data in understanding local food web structure and ecosystem function and intend to conduct these analyses using the full set of data that will be available after our final sampling in Sept/Oct 2009. Each section in the report has a limited page length it is assigned. As a result, not all detail and discussion can be presented. Therefore, each year we can provide a limited update and minor discussion of significance. A comprehensive analysis of our findings will be reported in a future SFER when space no longer required for data reporting becomes available.

Recommendation #24: *Lines 941-943 - interpretation/significance of these findings should be included.*

Response #24: We agree and will do so in future reports when all information is available and sufficient space for discussion is available.

Recommendation #25: *Lines 945-953 - the number of replicates should be provided here.*

Response #25: This will be added in the final version.

Recommendation #26: *Lines 954-962 - states that vegetation was separated into live and dead material. Was periphyton (a listed component of the vegetation) so separated? If not, the writing should be altered. Information should be added as to how periphyton biomass was assessed. Explanation should also be added about why belowground biomass of macrophytic vegetation was excluded from the biomass estimate, considering that belowground biomass can be (and is, for many macrophytes) a major component of the total. Supporting references are needed throughout.*

Response #26: Periphyton was not separated into live or dead material, but was sampled as epiphyton, epipelon and metaphyton and combined for a total biomass. See 2009 SFER for details and supporting references. Clarification that macrophytes not all vegetation were separated into live and dead was noted. Below ground biomass and production are also sampled, but were not reported in this year's report.

Recommendation #27: *Line 963 and Table 6-7, 1st line of legend - "Total" is incorrectly used because belowground biomass of macrophytes was not considered. The legend should also clarify that only aboveground biomass of macrophytic vegetation was measured.*

Response #27: Legend was clarified.

Recommendation #28: *Lines 963-974, Table 6-7 - the significance of the findings should be interpreted. The authors should also add explanation or inferences about why Chara became dominant in some treatments.*

Response #28: Explanation why *Chara* increased will be added in the final version.

Recommendation #29: *Line 984 - the depth where the measurements were taken should be added.*

Response #29: This information will be added in the final version.

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Recommendation #30: *Line 1013 - should clarify that samples were taken at six-month intervals.*

Response #30: Done.

Recommendation #31: *Lines 1030-1036 - should note the high variability (large error bars).*

Response #31: This information will be added in the final version.

Recommendation #32: *Lines 1076-1078 vs. pp.6-41 to 6-42 - do not match; it is not clear on pp. 6-41 to 6-42 that eukaryotic microorganisms in particular were more abundant in the open plots.*

Response #32: Additional text discussing the eukaryotic changes will be added in the final verison.

Recommendation #33: *Lines 1084-1085 - the significance of this finding to Everglades restoration should be mentioned. P.6-50, prior to the last paragraph – it would be helpful to summarize the major differences found in these studies between control and open plots.*

Response #33: An overall project summary and conclusion relative to restoration will be provided in a future SFER.

Landscape Ecology
This excellent section described four studies, all innovative and exciting:
1) A new South Florida Water Depth Assessment Tool (SFWDAT) was developed which integrates data from hundreds of real-time water level gauges managed by an array of agencies. This remarkable tool provides real-time spatial interpolation and daily animation of water depth. It also has been linked to two valuable ecological indices, a soil-based Muck Fire Risk index (Muck Fire Index) and a water recession-inundation index (Wading Bird recession Rate Index); 2) Peat loss and carbon emissions, as a result of human alteration of the Everglades, were estimated over the past 100 years by considering historic data and information (including helpful anecdotal accounts) and present-day topography; 3) A carbon mapping project was completed for the WCAs, based on ~650 soil samples taken in 2003; and 4) Demonstrating its clear leadership in remote sensing and photo-interpretation, the District acquired advanced technology, a new generation frame-based aerial digital camera (UltraCamX) with highly advanced color intensity range and ground pixel resolution of (0.5) 1 square foot. The District made rapid use of this exciting technology to obtain the most detailed aerial imagery in existence on nearly 2,000 square miles of the Everglades National Park (ENP) and other areas, complete with stereo images that will allow much-improved analysis of potential assessment tools such as canopy density or tree height.

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Integration Review

This year's Chapter 6 presents hydrologic patterns (1 project) followed by a focus on four main areas including wildlife ecology (3 projects), plant ecology (2 projects), ecosystem ecology (3 projects), and landscape (4 projects), thus covering 13 projects in total. The stated aim continues to be selection of projects based upon District short-term operational needs and long-term restoration goals. With few exceptions, the projects were presented so that overall goals were clear and well-linked to management and restoration goals.

<u>*Recommendation #34*</u>: *However, there was little cross-referencing within the chapter and little cross-referencing to other chapters, which would not be difficult, and little by way of integrative data summaries and analyses bridging projects, which would be more challenging.*

Response #34: In the plant section introduction, the following cross-reference will be added in the final version:

For the third consecutive year, District scientists are working with contractors to survey tree islands in WCA-3A and -3B for the presence of the invasive Old World Climbing Fern (Lygodium microphyllum) and other invasive exotic species. This year's survey of approximately 40 tree islands brings the total number of tree islands surveyed by the District to 259 since large-scale surveys began in the year 2005. See chapter 9 for details about the invasive species monitoring

Table 6-1 again was outstanding in its format. It provided an excellent framework overview of the topics covered, findings, and related mandates. Its legend makes the important integrative point (reinforced in various sections throughout the chapter) that the research projects described in the chapter are related to one to seven operational mandates, listed specifically for each of the 13 projects. As in last year's version of Chapter 6, the hydrological set-up section also was outstanding in integrating key processes (e.g. wading bird nesting) and made the descriptions of the water conditions both understandable and readable. The Plant Ecology section focused on two unrelated studies, periphyton cyanotoxins and tree island ecophysiology, but explained the broader significance of each of these topics to Everglades functioning. The three subsections of the Wildlife section were well integrated, as were the four subsections of the Landscape section.

<u>*Recommendation #35*</u>: *The three inter-related studies within the Ecosystem section, surprisingly, were not as well integrated, a task that could easily be accomplished by adding a few sentences of explanation because the great value of each study to Everglades restoration is clear.*

Response #35: In final version, the introduction to the Ecosystem Section will read as:

Ecosystem research continues to focus on areas of the Everglades severely impacted by nutrient enrichment. For the last couple of years the focus of this section has been on the design and implementation of two large-scale manipulations in the cattail zone of WCA-2; the Cattail Habitat Improvement Project (CHIP) and the Accelerated Recovery Project (FIRE). In WY2008 CHIP was focused on a more detailed investigation of the microbial communities and wading bird foraging in artificially opened areas, while FIRE was focused on the chemistry of cattail and sawgrass ash, and soil reduction-oxidation reactions (redox) to see if fire can be an effective management tool. This year (WY2009), CHIP is focused upon a more comprehensive analysis of how structure and function have been altered in artificially opened areas, while FIRE examines the physical and biological factors affecting cattail mass and nutrient loss after controlled

burning. These two studies will allow the District to design a way to restore hydropatterns to WCA-3 and WCA-2A because combined they examine the cost and benefits of a cattail control program. A simple STELLA$^{©}$ model, used to evaluate soil-water TP exchange for impacted soils as a function of TP inflows, estimates how long it could take for these impacted **soils** to return to background if programs like FIRE and CHIP are not implemented.

Recommendation #36*: Opportunities were missed for integration with other chapters. For example, exotic species were alluded to only in lines 722-727, yet exotic species are a serious issue in the Everglades. Chapter 10 discusses a major research project on the Florida apple snail, and the apple snail recovery plan, yet, the importance of such invasive nonindigenous species was not mentioned in Chapter 6 (e.g. pp.6-23 to 6-29, para. on macroinvertebrates).*

Response #36: See reply to point #35.

On the other hand, integration with other areas of South Florida was especially well demonstrated through two Landscape projects. The new SFWDAT integrates the data from hundreds of real-time water level gauges throughout South Florida that are managed by three other agencies as well as the District. The new technology for digital aerial imagery was acquired and applied in WY2009 not only to the ENP, but also to the Southeastern Miami-Dade Coastal Wetlands and Biscayne Bay Coastal Wetlands for the CERP RECOVER vegetation mapping project. The potential is exciting for strong integration within the Greater Everglades as well as across other South Florida ecosystems, using SFWDAT and this new technology for digital aerial imagery.

Recommendation #37*: As recommended last year, it is suggested that Chapter 6 should have an overall "Conclusions" section that integrates the major findings and briefly describes short-term future directions (e.g. to be pursued in WY2010). The end of the Summary should then pull some highlighted statements from the Conclusions section to convey how the various subsections are being integrated to examine the five major areas described in this chapter. Also missing from this chapter was discussion about anticipated effects of climate change on the Everglades wildlife, plant ecology, etc.*

Response #37: *The idea of a conclusion has some merit but must be viewed with caution, as the SFER is not a comprehensive presentation of the scientific methods associated with results and conclusions. It is an update and often presents only preliminary results. If conclusions are viewed in this light, then a Conclusion section, as appropriate, will be added to the end of Chapter 6.*

Editorial Changes

Recommendation #38*: Table 6-1, p.6-5, CHIP, line 1 - ...the macroalga Chara,...*

Response #38: Text will be corrected in final document.

Recommendation #39*: Line 111 - ...last year, a year... ...*

Response #39: Text will be corrected in final document.

Recommendation #40*: Line 118 - ...WY2008, especially*

Response #40: Text will be corrected in final document.

*__Recommendation #__*__41__*: Line 616 - …cyanotoxins are present… …*

Response #41: Text will be corrected in final document.

__Recommendation #42__: Line 711 - …tree islands, were

Response #42: Text will be corrected in final document.

__Recommendation #43__: Line 743 - …season

Response #43: Text will be corrected in final document.

__Recommendation #44__: Line 765 - the reference Korselman and Meuleman (1996) is missing from the Literature Cited.

Response #44: Text will be corrected in final document. Koerselman W. and A.F.M. Meuleman. 1996. The vegetation N:P ratio: a new tool to detect the nature of nutrient limitation. *Journal of Applied Ecology.* 33: 1441-1450.